IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

In re Patent Application of: **MARINET ET AL.**	)	Examiner: **C. A. REVAK**
Serial No. **09/995,258**	)	Art Unit: **2131**
Filing Date: **NOVEMBER 27, 2001**	)	Attorney Docket No. **00RO27254350**
For: **RANDOM SIGNAL GENERATOR**	)	

APPELLANTS' APPEAL BRIEF

MS Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is Appellants' Appeal Brief together with the requisite $510.00 large entity fee for filing a brief. If any additional extension and/or fee is required, authorization is given to charge Deposit Account No. **01-0484.**

(1) Real Party in Interest

The real party in interest is STMicroelectronics S.A., assignee of the present application, as recorded at reel 012619, frame 0056.

(2) Related Appeals and Interferences

At present, there are no related appeals, interferences, or judicial proceedings.

(3) Status of the Claims

Claims 1-16 have been canceled. Claims 17-32 and 42-49 are pending in the application, stand rejected, and are all being appealed herein. Claims 33-41 have been withdrawn.

(4) Status of the Amendments

All amendments have been entered and there are no further pending amendments. A copy of the claims involved in this appeal is attached hereto as Appendix A.

(5) Summary of the Claimed Subject Matter

Independent Claim 17 is directed to a random signal generator **1**. The random signal generator comprises an electronic noise source comprising a folded MOS transistor $\mathbf{M_C}$ having a drain-source current with a random component **32**. The folded MOS transistor $\mathbf{M_C}$ comprises a drain and a source with a folded channel **24** defined therebetween. The random signal generator **1** further comprises a circuit **5** for generating a digital signal based upon the random component **32**. (See Figures 1, 3a-3b, and 4, reproduced below; Specification page 6, line 7 through page 7, line 5; and page 8, line 23 through page 10, line 17).

For example, as discussed at page 2, lines 25-37 of the present application, the folded MOS transistor, as in the claimed invention, is known to be unusable when the technology employed is pushed to its limits, as recited in dependent Claim 18. Folded MOS transistors are unusable in these situations because

the drain-source current has an increasingly strong random component when the size of the zigzag-shaped channel decreases. The claimed invention takes advantage of this drawback to provide a random signal generator that can be integrated within an integrated circuit, particularly, an integrated circuit for smart cards.

Independent Claim 25 is directed to a random signal generator circuit comprising a random signal generator circuit comprising a plurality of random signal generators **1a-1n**. Each random signal generator **1a-1n** may comprise an electronic noise source comprising a folded MOS transistor $\mathbf{M_C}$ having a drain-source current with a random component **32**. The folded MOS transistor $\mathbf{M_C}$ may comprise a drain and a source with a folded channel **24** defined therebetween. Each random signal generator **1a-1n** also includes a circuit **5** for generating a digital signal based upon the random component **32**, and a logic circuit **5'** connected to the random signal generators for combining the digital signals for generating a digital number. (See Figures 1, 3a-3b, 4, and 7, reproduced below; Specification page 6, line 7 through page 7, line 5; and page 8, line 23 through page 10, line 27).

Independent Claim 42 is directed to a method for generating a random number from an electronic noise source. The method may include providing a folded MOS transistor $\mathbf{M_C}$ having a drain-source current with a random component **32**. The folded MOS transistor comprising a drain and a source with a folded channel

24 defined therebetween. The method also includes generating a random digital signal based upon the random component **32**. (See Figures 1, 3a-3b, and 4, reproduced below; Specification page 6, line 7 through page 7, line 5; and page 8, line 23 through page 10, line 17).

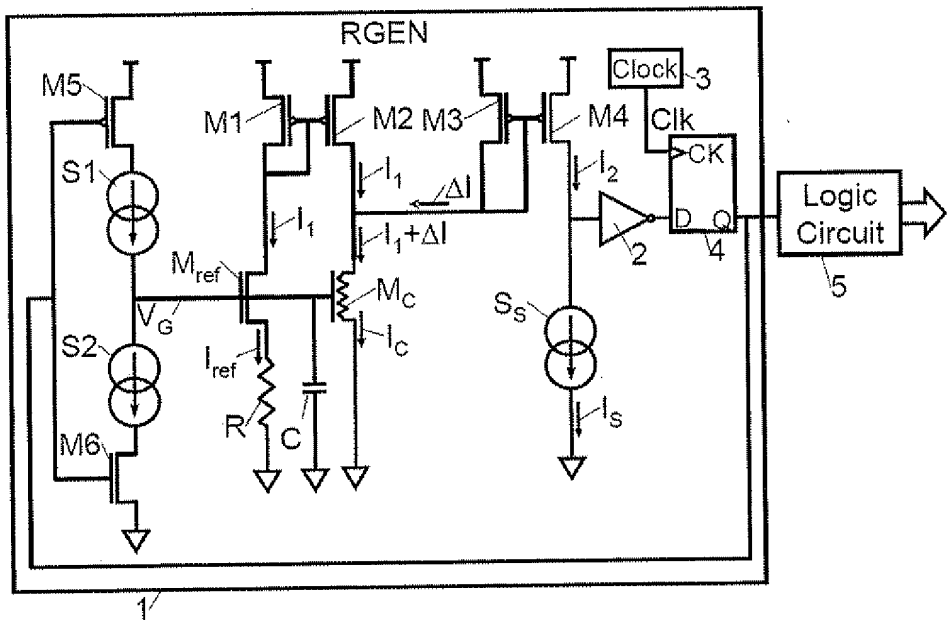

Figure 1 of the Present Application

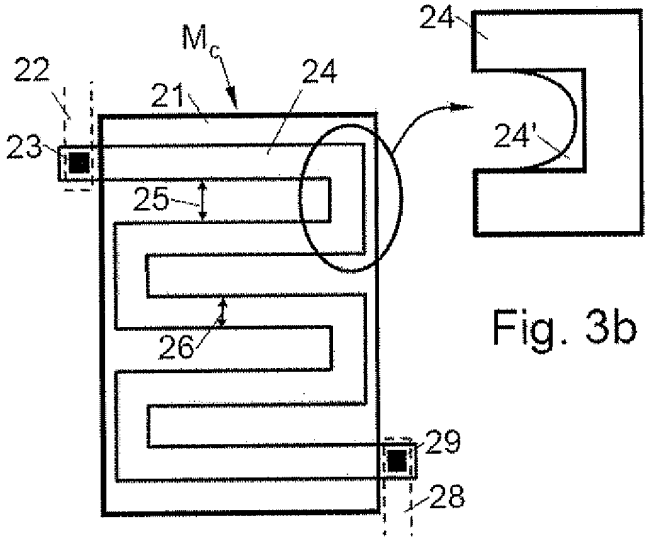

Fig. 3b

Fig. 3a

Figures 3a and 3b of the Present Application

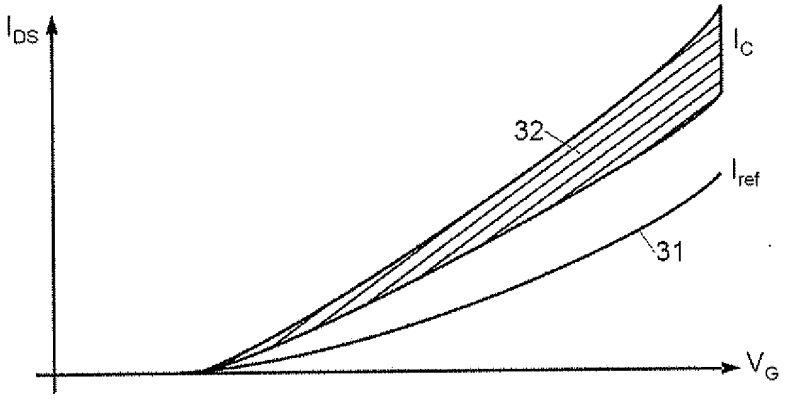

Figure 4 of the Present Application

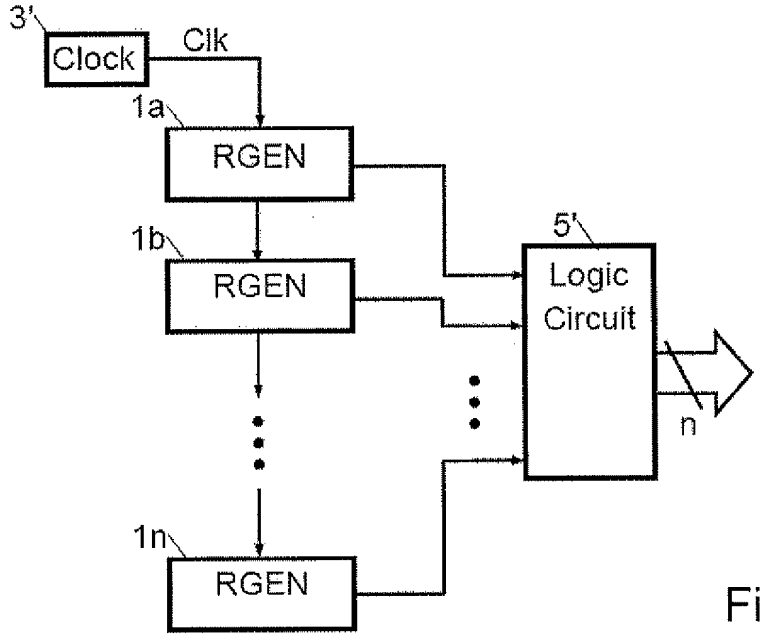

Fig. 7

Figure 7 of the Present Application

(6) Grounds of Rejection to be Reviewed On Appeal

The Examiner rejected Claims 17-32 and 42-49 under 35 U.S.C. §102(b) over U.S. Patent No. 4,862,237 to Morozumi.

(7) Argument

As will be described in greater detail below, Appellants respectfully submit that the Examiner's rejection over Morozumi is improper. Moreover, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner and withdraw the rejection of the claims.

The Rejection Over Morozumi

The Examiner rejected independent Claims 17, 25, and 42 over Morozumi. Morozumi discloses a solid-state imaging sensor comprising a sensing cell, as depicted in Figures 14a-b. The sensing cell comprises an S-shaped channel region that serves as a photosensitive layer for the imaging sensor and stores photo-excited current. (Col. 10, lines 13-17). As depicted in Figure 18 of Morozumi, reproduced below, the relationship between photosensitive current generated and the corresponding incident light on the imaging sensor cell is substantially linear.

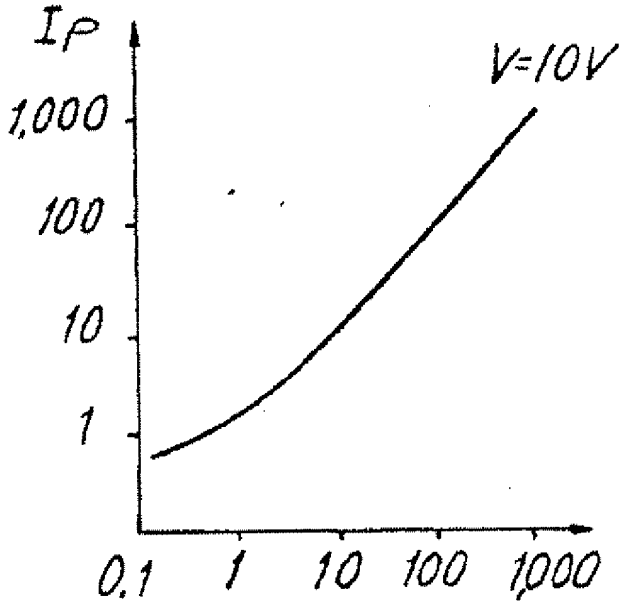

Figure 18 of Morozumi

In contrast, independent Claim 17, for example, recites an electronic noise source comprising a folded MOS transistor having a drain-source current with a random component. This random component **32** is helpfully depicted in Figure 4 of the present application, reproduced again below.

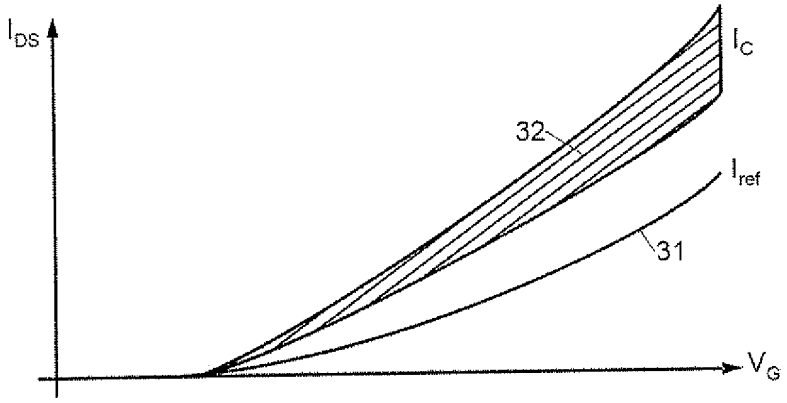

Figure 4 of the Present Application

Morozumi does not disclose any source for generating a random signal, as in the claimed invention. The imaging sensor of Morozumi depends on predictable currents being generating in the channel of the sensing cell to generate accurate signals relating to the image being sensed. The accompanying circuitry of the imaging sensor produces a predictable and accurate signal from the generated photosensitive current. (Col. 2, lines 63-68).

Indeed, the portion of Morozumi cited by the Examiner recites that "the charge generated in the photo-sensitive member is directly proportional to the incident light, the sequential sampling of the adjacent sensing cells allows for the conversion of photo images into electrical signals." (Col. 3, lines 18-22). Moreover, Appellants respectfully submit that Morozumi also fails to disclose a circuit for generating a digital signal based upon the random component, as also recited by independent Claim 17. Therefore, because of these above noted deficiencies of Morozumi, independent Claim 17 is patentable over the prior art. Independent Claims 25 and 42 are similar to Claim 17 and are patentable for similar reasons.

The Examiner also contended that the claim recitation of a "random component" is an intended use of the claimed invention and gave it no patentable weight. The Examiner also contended that Morozumi discloses the claim feature since it is capable of performing the claim feature.

Appellants respectfully note that if a claim element is not expressly disclosed by the prior art, the reference must

inherently disclose the claim element to anticipate it. *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999). The court went on to state that:

> [t]o establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2D (BNA) 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 U.S.P.Q.2D (BNA) at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)). *Id.* at 745. (emphasis added)

A person of ordinary skill in the art would not appreciate the needed modifications to Morozumi to produce the claimed invention. Indeed, Morozumi is directed to an entirely different field, i.e. predictable and regular current generation for an imaging sensor. Therefore, for this reason also, independent Claims 17, 25, and 42 are patentable over the prior art.

Moreover, Appellants submit that a folded MOS transistor having a drain-source current with a random component, as recited in the independent claims, is not intended use, as contended by the Examiner. Appellants submit that this claim feature defines a distinct structure of the folded MOS transistor that produces a random component in the drain-source current.

Differently, the structure of Morozumi produces a consistent and proportional current so as to server as an image sensor. Indeed, Appellants submit that the S-shaped channel region of Morozumi cannot produce a random signal, as in the claimed invention.

Accordingly, for all the above reasons, it is submitted that independent Claims 17, 25, and 42 are patentable over the prior art. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

CONCLUSIONS

In view of the foregoing arguments, it is submitted that all of the claims are patentable over the prior art. Accordingly, the Board of Patent Appeals and Interferences is respectfully requested to reverse the earlier unfavorable decision by the Examiner.

Respectfully submitted,

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APPENDIX A - CLAIMS ON APPEAL
FOR U.S. PATENT APPLICATION SERIAL NO. 09/995,258

17. A random signal generator comprising:

an electronic noise source comprising a folded MOS transistor having a drain-source current with a random component;

said folded MOS transistor comprising a drain and a source with a folded channel defined therebetween; and

a circuit for generating a digital signal based upon the random component.

18. A random signal generator according to Claim 17, wherein the folded channel is S-shaped and has a size that is at a resolution limit based upon manufacturing technology.

19. A random signal generator according to Claim 17, wherein the folded channel is zigzag-shaped and has a size that is at a resolution limit based upon manufacturing technology.

20. A random signal generator according to Claim 17, further comprising a reference transistor connected to said folded MOS transistor, said reference transistor receiving a gate voltage and a bias current equal to a gate voltage and a bias current applied to said folded MOS transistor for causing the drain-source current therefrom to randomly vary.

21. A random signal generator according to Claim 17, further comprising a comparison circuit for comparing the randomly varying drain-source current to a detection current.

22. A random signal generator according to Claim 21, wherein said comparison circuit determines a difference between the randomly varying drain-source current and the detection current; and further comprising an amplifier for amplifying the difference.

23. A random signal generator according to Claim 17, wherein said circuit comprises a sampling circuit for sampling the digital signal for providing a random digital word.

24. A random signal generator according to Claim 17, further comprising an integrating circuit for maintaining a gate voltage on said folded MOS transistor within a desired range of values.

25. A random signal generator circuit comprising:

a plurality of random signal generators, each random signal generator comprising

an electronic noise source comprising a folded MOS transistor having a drain-source current with a random component,

said folded MOS transistor comprising a drain and

a source with a folded channel defined therebetween, and

a circuit for generating a digital signal based upon the random component; and

a logic circuit connected to said plurality of random signal generators for combining the digital signals for generating a digital number.

26. A random signal generator circuit according to Claim 25, wherein the folded channel is S-shaped and has a size that is at a resolution limit based upon manufacturing technology.

27. A random signal generator circuit according to Claim 25, wherein the folded channel is zigzag-shaped and has a size that is at a resolution limit based upon manufacturing technology.

28. A random signal generator circuit according to Claim 25, wherein each random signal generator further comprises a reference transistor connected to said folded MOS transistor, said reference transistor receiving a gate voltage and a bias current equal to a gate voltage and a bias current applied to said folded MOS transistor for causing the drain-source current therefrom to randomly vary.

29. A random signal generator circuit according to Claim 25, wherein each random signal generator further comprises a comparison circuit for comparing the randomly varying drain-source current to a detection current.

30. A random signal generator circuit according to Claim 29, wherein each comparison circuit determines a difference between the randomly varying drain-source current and the detection current; and wherein each random signal generator further comprises an amplifier for amplifying the difference.

31. A random signal generator circuit according to Claim 25, wherein each circuit comprises a sampling circuit for sampling the digital signal for providing a random digital word; and wherein said logic circuit generates the digital number based upon the random digital word.

32. A random signal generator circuit according to Claim 25, wherein each random signal generator further comprises an integrating circuit for maintaining a gate voltage on said folded MOS transistor within a desired range.

42. A method for generating a random number from an electronic noise source, the method comprising:

providing a folded MOS transistor having a drain-source current with a random component;

the folded MOS transistor comprising a drain and a source with a folded channel defined therebetween;

generating a random digital signal based upon the random component.

43. A method according to Claim 42, wherein the folded channel is S-shaped and has a size that is at a resolution limit based upon manufacturing technology.

44. A method according to Claim 42, wherein the folded channel is zigzag-shaped and has a size that is at a resolution limit based upon manufacturing technology.

45. A method according to Claim 42, further comprising:

providing a reference transistor connected to the folded MOS transistor; and

providing a gate voltage and a bias current to the reference transistor, the gate voltage and the bias current being equal to a gate voltage and a bias current applied to the folded MOS transistor for causing the drain-source current therefrom to randomly vary.

46. A method according to Claim 42, further comprising comparing the randomly varying drain-source current to a detection current.

47. A method according to Claim 46, wherein the comparing comprises determining a difference between the randomly varying drain-source current and the detection current; and further comprising amplifying the difference.

48. A method according to Claim 42, wherein the sampling comprises providing a random digital signal based upon the sampled random binary signal, and further comprising generating the random number based upon the random digital signal.

49. A method according to Claim 42, further comprising maintaining a gate voltage on the folded MOS transistor within a desired range of values.

In re Patent Application of
MARINET ET AL.
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APPENDIX B - EVIDENCE APPENDIX
PURSUANT TO 37 C.F.R. § 41.37(c)(1)(ix)

None.

APPENDIX C - RELATED PROCEEDINGS APPENDIX PURSUANT TO 37 C.F.R. § 41.37(c)(1)(x)

None.